

§ 23.1301

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(iv) All commuter category airplanes.

(2) The auxiliary power unit compartment of any airplane incorporating an auxiliary power unit.

(b) Each fire detector must be constructed and installed to withstand the vibration, inertia, and other loads to which it may be subjected in operation.

(c) No fire detector may be affected by any oil, water, other fluids, or fumes that might be present.

(d) There must be means to allow the crew to check, in flight, the functioning of each fire detector electric circuit.

(e) Wiring and other components of each fire detector system in a designated fire zone must be at least fire resistant.

[Amdt. 23–18, 42 FR 15042, Mar. 17, 1977, as amended by Amdt. 23–34, 52 FR 1833, Jan. 15, 1987; Amdt. 23–43, 58 FR 18975, Apr. 9, 1993; Amdt. 23–51, 61 FR 5138, Feb. 9, 1996]

Subpart F—Equipment

GENERAL

§ 23.1301 Function and installation.

Each item of installed equipment must—

(a) Be of a kind and design appropriate to its intended function.

(b) Be labeled as to its identification, function, or operating limitations, or any applicable combination of these factors; and

(c) Be installed according to limitations specified for that equipment.

[Amdt. 23–20, 42 FR 36968, July 18, 1977, as amended by Amdt. 23–62, 76 FR 75760, Dec. 2, 2011]

§ 23.1303 Flight and navigation instruments.

The following are the minimum required flight and navigation instruments:

(a) An airspeed indicator.

(b) An altimeter.

(c) A magnetic direction indicator.

(d) For reciprocating engine-powered airplanes of more than 6,000 pounds maximum weight and turbine engine powered airplanes, a free air temperature indicator or an air-temperature indicator which provides indications that are convertible to free-air.

(e) A speed warning device for—

(1) Turbine engine powered airplanes; and

(2) Other airplanes for which VMO/MMO and VD/MD are established under §§ 23.335(b)(4) and 23.1505(c) if VMO/MMO is greater than 0.8 VD/MD.

The speed warning device must give effective aural warning (differing distinctively from aural warnings used for other purposes) to the pilots whenever the speed exceeds VMO plus 6 knots or MMO+0.01. The upper limit of the production tolerance for the warning device may not exceed the prescribed warning speed. The lower limit of the warning device must be set to minimize nuisance warning;

(f) When an attitude display is installed, the instrument design must not provide any means, accessible to the flightcrew, of adjusting the relative positions of the attitude reference symbol and the horizon line beyond that necessary for parallax correction.

(g) In addition, for commuter category airplanes:

(1) If airspeed limitations vary with altitude, the airspeed indicator must have a maximum allowable airspeed indicator showing the variation of VMO with altitude.

(2) The altimeter must be a sensitive type.

(3) Having a passenger seating configuration of 10 or more, excluding the pilot's seats and that are approved for IFR operations, a third attitude instrument must be provided that:

(i) Is powered from a source independent of the electrical generating system;

(ii) Continues reliable operation for a minimum of 30 minutes after total failure of the electrical generating system;

(iii) Operates independently of any other attitude indicating system;

(iv) Is operative without selection after total failure of the electrical generating system;

(v) Is located on the instrument panel in a position acceptable to the Administrator that will make it plainly visible to and usable by any pilot at the pilot's station; and

(vi) Is appropriately lighted during all phases of operation.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as amended by Amdt. 23-17, 41 FR 55465, Dec. 20, 1976; Amdt. 23-43, 58 FR 18975, Apr. 9, 1993; Amdt. 23-49, 61 FR 5168, Feb. 9, 1996; Amdt. 23-62, 76 FR 75760, Dec. 2, 2011]

§ 23.1305 Powerplant instruments.

The following are required powerplant instruments:

(a) *For all airplanes.* (1) A fuel quantity indicator for each fuel tank, installed in accordance with § 23.1337(b).

(2) An oil pressure indicator for each engine.

(3) An oil temperature indicator for each engine.

(4) An oil quantity measuring device for each oil tank which meets the requirements of § 23.1337(d).

(5) A fire warning means for those airplanes required to comply with § 23.1203.

(b) *For reciprocating engine-powered airplanes.* In addition to the powerplant instruments required by paragraph (a) of this section, the following powerplant instruments are required:

(1) An induction system air temperature indicator for each engine equipped with a preheater and having induction air temperature limitations that can be exceeded with preheat.

(2) A tachometer indicator for each engine.

(3) A cylinder head temperature indicator for—

(i) Each air-cooled engine with cowl flaps;

(ii) [Reserved]

(iii) Each commuter category airplane.

(4) For each pump-fed engine, a means:

(i) That continuously indicates, to the pilot, the fuel pressure or fuel flow; or

(ii) That continuously monitors the fuel system and warns the pilot of any fuel flow trend that could lead to engine failure.

(5) A manifold pressure indicator for each altitude engine and for each engine with a controllable propeller.

(6) For each turbocharger installation:

(i) If limitations are established for either carburetor (or manifold) air

inlet temperature or exhaust gas or turbocharger turbine inlet temperature, indicators must be furnished for each temperature for which the limitation is established unless it is shown that the limitation will not be exceeded in all intended operations.

(ii) If its oil system is separate from the engine oil system, oil pressure and oil temperature indicators must be provided.

(7) A coolant temperature indicator for each liquid-cooled engine.

(c) *For turbine engine-powered airplanes.* In addition to the powerplant instruments required by paragraph (a) of this section, the following powerplant instruments are required:

(1) A gas temperature indicator for each engine.

(2) A fuel flowmeter indicator for each engine.

(3) A fuel low pressure warning means for each engine.

(4) A fuel low level warning means for any fuel tank that should not be depleted of fuel in normal operations.

(5) A tachometer indicator (to indicate the speed of the rotors with established limiting speeds) for each engine.

(6) An oil low pressure warning means for each engine.

(7) An indicating means to indicate the functioning of the powerplant ice protection system for each engine.

(8) For each engine, an indicating means for the fuel strainer or filter required by § 23.997 to indicate the occurrence of contamination of the strainer or filter before it reaches the capacity established in accordance with § 23.997(d).

(9) For each engine, a warning means for the oil strainer or filter required by § 23.1019, if it has no bypass, to warn the pilot of the occurrence of contamination of the strainer or filter screen before it reaches the capacity established in accordance with § 23.1019(a)(5).

(10) An indicating means to indicate the functioning of any heater used to prevent ice clogging of fuel system components.

(d) *For turbojet/turbofan engine-powered airplanes.* In addition to the powerplant instruments required by paragraphs (a) and (c) of this section, the following powerplant instruments are required: